

REMARKS

Applicants have carefully reviewed the outstanding Office Action on the above-identified application. Applicants have amended the application, as set forth herein, and respectfully submit that the application, as amended, is in condition for allowance.

In response to the objection raised in the Office Action with respect to the specification lacking a Brief Description of the Drawings section, Applicants have amended the specification on Page 4 to include such a section, which provides a brief description of drawing FIGS. 1-2. No new matter is believed to have been added by this amendment, and Applicants respectfully submit that the aforementioned objection has been overcome.

Applicants have amended independent claim 1 to recite that the first region of the working layer of the present invention extends into the working layer from the working surface **“to a depth of no more than 750 microns,”** which limitation originally appeared in dependent claim 5, and have cancelled claim 5. For the reasons set forth below, Applicants submit that claim 1, as amended, and its dependent claims, are patentable over the cited references, taken alone or in any combination. Applicants have also amended claim 6 to depend from claim 1.

Applicants have amended claims 12-13 and 18-19, and cancelled claim 20, to overcome the rejections raised in the Office Action under 35 U.S.C. § 112, first and second paragraphs, with respect to said claims. Specifically, claim 12 was amended to recite particles **“having an average particle size of less than 10 microns,”** consistent with the description of such particles on page 5 of the specification. Additionally, claim 13 was amended to recite “an average particle

size of **less than 20 microns**" to overcome the enablement rejection raised with respect to said claim. Claim 18 was amended to remove the language "a too rapid rate" from the claim, thereby overcoming the rejection raised in the Office Action with respect to said language. Claim 19 was amended to remove the term "other transition metal" and to replace same with the terminology "**cobalt or nickel, or cobalt and nickel**" to overcome the rejection raised with respect to the term "other transition metal." Claim 20 has been cancelled.

Applicants' claimed invention relates to a tool component comprising a working layer of ultra-hard abrasive (e.g., polycrystalline diamond PCD)) bonded to a substrate along an interface. The working layer includes a working surface and a periphery around the working surface which provides a cutting edge for the component. The working layer is formed from an ultra-hard abrasive having a first (outer) region extending into the working layer from the working surface to a depth of no more than 750 microns, and a second (inner) region in contact with the first region. The wear resistance of the first region is less than that of the second region (i.e., between 50% to 90% of that of the second region). Such a configuration and thickness of the first region has been found (as illustrated and discussed in the specification in connection with the test results shown in FIGS. 1-2) to provide a particularly effective way of achieving reduction in spalling and fatigue characteristics of the working layer.

U.S. Patent No. 6,290,008 to Portwood, et al. discloses inserts for earth-boring bits, which include a body portion adapted for attachment to a bit, and a top portion for contacting an earthen formation. The top portion of the insert includes two layers of PCD. The upper (or, primary) layer of the top portion presents a less wear-resistant PCD material, and the lower layer

of the top portion provides a more wear-resistant PCD material. Thus, the upper layer is of less wear resistance than the lower layer.

European Patent Application No EP 0 411 831 A1 to Reed Tool Company ("Reed") discloses a cutting element for a rotary drill bit with a multilayer cutting surface. The front (outer) portion of the cutting surface is less wear resistant than the remaining (inner) portion of the cutting surface.

U.S. Patent No. 4,694,918 to Hall discloses a rock bit with diamond tip inserts. Each insert includes an outermost layer of PCD and inner transition layers made of diamond crystals and pre-cemented tungsten carbide. The outermost layer is more wear resistant than the inner transition layers (see col. 8, lines 43-68).

U.S. Patent No. 5,505,748 to Tank, et al. discloses a method of making an abrasive compact. The method utilizes conventional compact manufacture conditions, and is characterized by the mass of the abrasive particle used. The mass of has an average particle size of less than 20 microns and consists of particles having at least three different average particle sizes.

U.S. Patent No. 5,468,268 to Tank, et al. discloses a method of making an abrasive compact using conventional compact synthesis conditions. An ultra-hard abrasive particle mass is used, comprising at least 25 percent by mass of ultra-hard abrasive particles having an average particle size in the range of 10-100 microns, and particles having at least three different average

particle sizes. At least 4 percent by mass of ultra-hard abrasive particles are used, having an average particle size of less than 10 microns.

U.S. Patent Application Publication No. US 2004/0112358 A1 to Dossena, et al. discloses a frame saw for cutting granite and a method to improve performance of the frame saw. The saw includes generally parallel, spaced-apart blades, each of which has a cutting edge with diamond cutting segments mounted thereon. The segments cut granite in a swinging motion, and have segment variables which are optimized for uniform wearing of the segments along each blade.

Applicants respectfully submit that independent claim 1, as amended, is patentable over the references cited in the Office Action, taken alone or in any combination. Claim 1 was amended to recite that the first (outer) region of the working layer of the present invention extends into the working layer from the working surface “**to a depth of no more than 750 microns.**” This limitation originally appeared in dependent claim 5, which was rejected as being obvious over Portwood, et al. in view of Hall, and obvious over Reed in view of Hall. However, Applicants respectfully submit that neither Portwood, et al., Reed, nor Hall render amended claim 1 obvious.

First, one of ordinary skill in the art would not be motivated to combine the teachings of Portwood, et al. or Reed with the teachings of Hall, since the structures disclosed in Portwood, et al. and Reed differ significantly from the structure disclosed in Hall. The cutting structures disclosed in Portwood, et al. and Reed each include inner and outer regions, such that the outer

region is formed from a material of less wear resistance than the inner regions. Hall, by contrast, discloses the opposite of such structures -- i.e., it discloses a cutting structure having inner and outer regions, such the outer region is formed from a material of greater wear resistance than the inner region. Due to these significant structural differences, one of ordinary skill in the art would not look to the teachings of Hall to modify the thicknesses of the outer regions of the devices disclosed in Portwood, et al. and Reed.

Second, even if one were to combine the teachings of Hall with those of Portwood, et al. or Reed, the combination would not result in the present invention, as set forth in amended independent claim 1. Claim 1, as amended, requires that the first (outer) region be formed of a material which is of less wear resistance than the second (inner) region, and which has a thickness of no more than 750 microns. Hall specifically discloses providing a device wherein the layer of greater wear resistance, not lesser wear resistance, is about 125 microns in thickness. If Hall were combined with the teachings of Portwood, et al. or Reed, the resulting device would be a cutting element which has a region of greater wear resistance (i.e., an inner region) that is about 125 microns in thickness. By contrast, amended claim 1 requires an outer region of lesser wear resistance having a thickness of no more than 750 microns in thickness. As such, the combination of Portwood, et al. or Reed with Hall does not render amended claim 1 obvious.

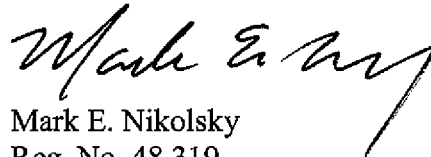
None of the remaining cited references teach or suggest providing a cutting element having a outer region of lesser wear resistance than an inner region, and which has a thickness of no more than 750 microns.

In view of the foregoing, Applicants respectfully submit that independent claim 1, as amended, is in condition for allowance. Claims 2-4 and 6-19, which depend from amended claim 1 and contain all of the limitations thereof, are patentable for the same reasons.

All issues raised in the Office Action are believed to have been addressed. Claims 1, 12-13, and 18-19 were amended, and claims 5 and 20 were cancelled. Claims 1-4 and 6-19 are pending, and are in condition for allowance. No new matter has been added. Re-examination is requested and favorable action solicited.

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Respectfully submitted,



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